Crustaceans (Ostracoda, Cladocera, Copepoda) from basins of the River Tisa region (Ukraine)

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Introduction

The existence of aquatic populations of any region is determined by the amount and quality of water accessing the area.

The quality of water in the river is dependent on interactions between a number of processes either natural or caused by anthropogenic agents. The former conventionally refers to the eduction (the so-called 'self-purification' processes) of water. Numerous living organisms participate in these processes by withdrawing organic matter and accessible mineral substances from the water. On the other hand, more often, certain hydrobionts are associated with the pollution of water with extraneous products related to the various economic activities of humans. The more stable a community of aquatic dwellers is, the more successful they will be in withdrawing and transforming various extraneous admixtures present in the water. As a result, better water quality will be achieved.

The knowledge about the structure and the peculiarities of the functioning of the communities of aquatic organisms is a necessary condition for the effective control of water quality and for the due detection of unfavourable changes. Knowledge in this field serves as basis for developing practical measures of the improvement of water quality.

Under the mountainous conditions of the Carpathian territory of Ukraine, a relatively big river (i.e. River Tisa: a large tributary of River Danube) serves as the basic drain of the area. River Tisa is the major aqueous artery and the basic source of drinking water in Hungary.

In accordance with those mentioned above, we consider that finding out the species composition of communities inhabiting the basins of the River Tisa region is an important stage of the research analysing the formation of water quality.

Keywords: microzoobenthos, zooplankton, crustaceans.

Materials and Methods

The material for the research was mainly samples of microzoobenthos and also periphyton and zooplankton. We took samples from rivers, brooks, springs and basins

with stagnant water, which were associated with River Tisa. Sampling was carried out over 7 years, mainly in the summer period. The procedure of processing the samples is given in previously published papers (N. Kovalchuk 1990, 1993, 1997).

Results and Discussion

Microscopic organisms and animals that are fine by size but are highly organised are poorly investigated in this area of the Tisa region, and represent special interest. In particular, the planktonic and benthic crustaceans of the groups Copepoda, Cladocera and Ostracoda are concerned. Unfortunately, there has been only one monograph (Polishchuk and Garasevich, 1986) recently that offers an up-to-date representation of the richness of living organisms, including crustaceans, inhabiting the diverse basins of the region of River Tisa in its Ukrainian reach. In the monograph «Hydroecology of the Ukrainian reaches of the Danube and allied basins» (1993) only the chapter by A. A. Kovalchuk «Protozoans and the microfauna» contains data on the region of River Tisa, while the rest of the materials appearing there are more general, dealing with the regions of the rivers Tisa and Prut, and also including zooplankton data.

As a result of of our studies we revealed 28 species and subspecies of crustaceans, namely: 3 species from the group Ostracoda, 3 from Cladocera, 7 from Copepoda Cyclopoida, and 14 from Copepoda Harpacticoida. Data from our research and the findings of other authors allow to ascertain that presently 87 species and subspecies of crustaceans of the distinguished groups (see Table) are known from the basins of the diverse Ukrainian reach of River Tisa. It is necessary to emphasiye that the group Ostracoda had not been studied specially in the region. The specific findings do not give definitive information about species richness. The species composition of Cladocera, Copepoda Cyclopoida, and Copepoda Calanoida in the examined mass is usual for planktonic communities.

Te suborder Harpacticoida is of special interest. Based on the results of research studies focusing on this group of crustaceans, some have been assumed to be species new for science or for the region. Only Harpacticoida have considerably high organization in the microscopic range. Due to this, as climatic conditions changed in the course a long historic period, it became possible for these species to occupy different ecotopes: to leave open water and inhabit interstitial waters or the phreatic waters of springs. In contrast with larger animal species demanding large ecotopes with stable conditions, it is obvious that Harpacticoida, with their greater quantities, have been able to remain in the state of high species richness, and are today live witnesses of bygone epochs. All these make the group extraordinarily interesting to the researchers of the evolution of the world's fauna, and especially to biogeographers. Harpacticoids are valuable subjects for the analysis of the ways in which faunistic complexes and natural systems of present time have formed. Their group is a major object of ecological researches both in the general theoretical sense or in the applied nature conservation approach.

Conclusions

The knowledge about crustaceans inhabiting the basins in the Ukrainian reaches of River Tisa is unsatisfactory. Certain groups of crustaceans such as Ostracoda or bottom-dwelling and vegetation-inhabiting Cladocera have not been investigated generally. Our results of the study of the group Harpacticoida testify that they may have a potentially high and yet undescribed species richness. This especially concerns interstitial crustaceans. It is necessary to note that adverse changes are taking place in mountainous ecosystems. They are caused by the active economic activity of humans (in particular, mostly by improper forestry), which, as regards its strength, is comparable with natural disasters. Under such conditions a number of aquatic dwellers that presently ensure us catarobic water, may disappear from the Earth's surface, even before being described by science.

Summary

Systematised data on the species composition and distribution of crustaceans in the microzoobenthos, zooplankton and periphyton of basins in the diverse Ukrainian region of River Tisa are presented. In the final table 87 species and subspecies of crustaceans, discovered by the author and other researchers, are included.

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N	Species	Sample *	Our findings							Another findings ***	
			R. Tisa	tributaries	** headwater regions						
					I	II	III	IV	V	A	B
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
	OSTRACODA										
1	Candona stagnalis G.O.Sars	-								7	
2	C.neglecta G.O.Sars	-								7	
3	C.paralle G.W.Mul.	-								7	
4	Cyclocypris ovom (Jurine)	mb			Uzh			+			
		ppb .			Tereblia				+		
										7	
5	Cypria stygia (Jurine)									7	
6	Cypridopsis parva G.W.Mul.	mb							+		
7	C. vidua (O.F.Mul.)	-								7	
8	C. orientalis Bronst.	mb			Bila Tisa	+					
	CLADOCERA										
9	Acroperus harpae (Baird.)	-								7	
		zp									8
10	Alona quadrangularis (O.F.Mul.)	pph							+		
11	Alonella excisa (Fischer)	-								7	7
12	A. nana Baird	zp									6
13	A. rectangula Sars	-								7	7
14	Biapertura affinis (Leydig.)	-								7	7
15	Bosmina longirostris (O.F.Mul.)	-								7	7
		zp									6,8
16	B. 1 cornuta (Jurine)	-								7	
17	Camptocercus rectirostris Schoedler	-									7
18	C. lilljeborgi Schoedler	-									7
19	Ceriodaphnia pulchella Sars	-									7
20	C. reticulata (Jurine)	mb			Uzh			+			
		-									7

Table. Crustaceans (Ostracoda, Cladocera, Copepoda) of basins in the region of River Tisa (in Ukraine)

Notes. *: «-» not specified, «mb» - microzoobenthos, «zp» - zooplankton, «pph» - periphyton, «inst» -interstitial. **: «I» - region of tributary, «II» - small rivers, brooks, «III» - springs, «IV» - puddles and other temporary basins, «V» - lake Sinevir. ***: - «A» - mountain reaches of the Tisa region, «B» - foothill reaches of the Tisa region (figures 1-7 in the last two coloumns refer to the corresponding serial numbers of the literature list; 8 - G.V. Parchuk, personal communication).

1	2	3	4	5	6	7	8	9	10	11	12
21	Chydorus sphaericus (O.F. Mul.)	-								7	7
		zp								8	8
22	Daphnia cucullata Sars	zp								8	8
23	D. galeata Sars	zp									8
24	D. longispina O.F. Mul.	-								7	7
25	D. l.littoralis Sars	-								7	
26	D. magna Straus	-									7
27	D.pulex (De Geer)	-									7
		zp									8
28	D. p. obtusa Kuts	-								7	
29	Disparalona rostrata rostrata (Koch)	-								7	7
		mb							+		
30	Ilyocryptus sordidus (Lievin)	-								7	7
31	Leydigia leydigii (Schoedler)	-								7	
32	Macrothrix laticornis (Jurine)	-									7
33	Moina brachiata (Jurine)	-									7
34	M. micrura Hellich	-									7
		zp									6,8
35	M. rectirostris (Leydig)	-									7
36	Pleuroxus truncatus O.F. Mul.	-								7	7
37	Rhynchotalona rostrata (Koch)	zp									8
38	Scapholeberis mucronata (O.F. Mul.)	-									7
39	Sida clystallina (O.F. Mul.)	-								7	7
40	Tretocephala ambigua (Lill).)	-								7	
COPEPODA Calanoida											
41	Acanthodiaptomus denticornis (Wierz.)-	-								7	
42	Eudiaptomus coeruleus (Fischer)	-								7	7
43	E. gracilis (Sars)	-								7	7
		zp									8
COPEPODA Cyclopoida											
44	Acanthocyclops americanus (Marsh.)	-									7

Table continue

1	2	3	4	5	6	7	8	9	10	11	12
45	A. a. spinosa (Monchenko)	-									7
46	A. gigas (Claus)	-								7	
47	A. kieferi (Chappuis)	inst								5	
48	A. robustus (Fischer)	zp									8
49	A. vernalis vernalis (Fischer)	mb			Uzh			+			
		-									7
50	A. viridis (Jlirine)	-									7
51	Cyclops furcifer Claus	-									7
52	Ń. strenuus (Fischer)	-									7
		zp									8
53	C. vicinus Uljanin	-								7	7
		zp									8
54	Diacyclops bicuspidatus (Claus)	-								7	
55	D. bicnspidatus f. odessana (Schmank.)	zp		Chorna Tisa							
56	Eucyclops macruroides (Lillj.)	-								7	7
57	E. macrurus (Sars)	-								7	
58	E. serrulatus (Fisch.)	mb		Chorna Tisa							
		pph							+		
		-								7	7
		mb								4	
59	E. s. proximus Lillj.	-								7	7
60	Macrocyclops albidus (Jurine)	-								7	7
		zp									8
61	M. fuscus (Jurine)	pph							+		
62	Mesocyclops leuckarti (Claus)	-									7
63	Metacyclops gracilis (Lillj.)	zp								8	
64	P. fimbriatus fimbriatus (Fischer)	zp							+		
		-								7	7
		zp					+				
		zp	+								
		mb								4	
		zp									8
65	P. f. chiltoni (Thoms)	mb			Uzh	+					
		-									7
		mb								4	

Table continue

1	2	3	4	5	6	7	8	9	10	11	12
66	Paracyclops poppei (Rehb.)	zp		Teresva							
67	Themiocyclops oithonoides (Sars)	-									7
		zp									8
COPEPODA Harpacticoida											
68	Arcticocamptus laccophilus (Kessler)	mb			Teresva		+				
69	Attheyella crassa (G.O.Sars)	mb	+								
		mb			Už	+	+				
		mb							+		
		mb		Rika							
		mb		Bilae Tisa		+					
		mb	+								
		-								7	
		mb								4	4
70	Att. wierzeiskyi (Mrazek)	mb			Uzh	+	+				
		mb								4	
		mb			Bila Tisa	+	+				
71	Bryocamptus minutus (Claus)	mb			Uzh		+				
72	B. pygmaeus (Sars)	-								7	7
73	B. spinulosus v. occidentalis Sterba	mb			Teresva		+				
		mb			Uzh	+	+				
		mb			Bila Tisa	+	+				
		mb								4	
74	B. tamogradskyi Borutzky	mb			Tereblia	+					
		mb			Uzh	+	+				
		mb			Bila Tisa	+					
75	B. typhlops (Mrazek)	mb			Uzh	+					
76	B. zschokkei caucasicus Borutzky	mb			Uzh		+				
		zp		Chorna Tisa							
		mb			Uzh	+.					
		mb			Bila Tisa	+	+				
77	Canthocamptus staphylinus (Jurine)	-									7
		zp								8	8
78	C. s. staphylinus (Jurine)	mb								4	
79	Echinocamptus hoferi (VanDouwe)	mb			Teresva	+					

Table continue

1	2	3	4	5	6	7	8	9	10	11	12
		mb			Bila Tisa	+	+				
		mb			Uzh	+	+				
80	Ech. luenensis (Schmeil)	mb			Uzh		+				
		mb								4	
81	Epactophanes richardi v. quadrispinosus (Richters)	mb			Bila e Tisa	+					
		mb								4	
82	Moraria pectinata Tbieband et Pelosse	mb			Tereblia	+					
		mb			Uzh	+					
		mb			Bila Tisa	+	+				
83	M. poppei poppei (Mrazek)	mb			Uzh		+				
84	M. subterranea (Carl)	mb			Bila Tisa	+					
85	Paracamptus schmeili (Mrazek)	mb								4	
86	Parastenocaris gorganensis N. et A. Kovalchuk	mb			Teresva		+				
87	Viguierella paludosa (Mrazek)	-									7

Table continue